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NORTH YONGE CENTRE

TRANSPORTATION STUDY

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Metropolitan Toronto Planning Department
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NORTH YONGE CENTRE TRANSPORTATION STUDY

1.0 Introduction

The principal objective of this analysis is the identification of those transportation system improvements required to accommodate projected growth in the North Yonge Centre. The primary focus of the analysis is on what may be considered the ultimate development of the 'Centre', incorporating the land-use provisions of the present North Yonge Centre Plan (OPA D-11-48) as amended and the proposed revisions to this plan proposed in the April 1983 review prepared by North York staff. Subsequent to this analysis, a compromise proposal was recently transmitted to the North York Planning Advisory Committee by Mayor Lastman and the local Aldermen subsequent to a series of meetings with the local ratepayers' associations. This proposal was reviewed and found to result in a similar level of development to that proposed in the April 1983 review.

Two interim levels of development were considered in conjunction with the phasing of the improvements. The first incorporates only those development proposals approved by the City of North York through June 1983, and the second incorporates the land use provisions of the present North Yonge Centre Plan as amended.

Although no specific time frames are attached to the various levels of development, mature development of the centre to the employment and population levels proposed could take up to 30 years.

Figure 1 indicates the location and extent of the 'Centre'. A summary of the employment and population assumptions associated with the three levels of development is presented in Table 1.

When the analysis was initiated, three potential applications for the conclusions of the analysis were considered:

(1) Enable Metro to review the proposed modifications to North York Official Plan Amendment No. D-11-48;

(2) Provide the basis for a transportation plan for the North Yonge Centre Area; and,

(3) Provide a framework for the review of individual development proposals in and around the North Yonge Centre.

These conclusions reflect the results of both Phase I of the analysis which dealt at a macro level with roadway and transit access to the 'Centre', and Phase II which considers roadway requirements in greater detail.

The analysis was undertaken by staff of the Metro Planning Department. Background information and ongoing review of the analysis were provided by a working group consisting of staff from the Toronto Transit Commission, the Metropolitan Planning and Roads and Traffic Departments, and the City of North York Planning and Traffic Departments.

2.0 Travel Demand Analysis

The estimation of travel demand associated with long-range development of the 'Centre' incorporates the following principal assumptions (Background material is contained in a number of discussion and working papers listed in the Appendix):

(1) Ultimate employment and population of 66,000 and 28,900 respectively based on land-use parameters as outlined in Official Plan Amendment No. D-11-48 and the April 1983 review of this amendment;

(2) Trip generation associated with future development according to currently typical rates;

(3) Trip distribution based on 1981 Census journey-to-work data, the Metropolitan Travel Demand Model, the Metro Cordon Count and a survey of Sheppard Centre employees carried out by North York staff in 1981;

(4) Person-trip modal split for generated travel assumed to be:

Transit	60%
Auto	33%
Walk/other	7%

For further discussion of these assumptions see Section 3.2.

(5) Traffic assignment was accomplished using the 'MOTORS' package (all-shortest-route) with manual adjustments where necessary. The road network used consisted basically of arterial and collector roads - local roads were generally not included unless an integral part of the 'Centre'. Transit assignments were undertaken on the basis of likely commuter-sheds;

(6) Traffic demand is computed as existing (counted background) traffic plus that generated by future development or redevelopment in the 'Centre'. Transit demand was considered in a similar manner.

(7) Afternoon peak hour travel was the focus of the analysis. Morning peak hour conditions may generally be approximated through a mirror image of the afternoon peak situation.

The resulting travel volume forecasts are presented later in the report in conjunction with the discussion of system improvements. These estimates were compared with generalized roadway and transit system capacities to enable the identification of deficiencies and requirements as discussed in the succeeding sections of the report.

3.0 Roadway System Requirements

3.1 Description and Discussion of Required Improvements

In Phase I of the analysis overall access to the 'Centre' was considered at a macro level on the basis of a surrounding cordon. It was concluded, based on the estimated demand for some 7,100 additional outbound vehicle trips during the peak hour, that three (3) additional east-west arterial lanes (per direction) would be required east of Yonge Street while two (2) would be required west of Yonge Street. The Phase I analysis did not address either local traffic circulation or traffic conditions beyond the cordon.

Phase II of the analysis represents a refinement of Phase I, considering in greater detail traffic circulation in the 'Centre' area and on the surrounding road network, based on a more detailed traffic assignment and evaluation process. In addition to the identification of arterial road requirements, two alternative concepts were developed for traffic circulation within the immediate area of the 'Centre'.

Based on the results of both phases of the analysis, a conceptual roads plan was developed, reflecting the improvements which would be required to accommodate the projected ultimate level of activity in the 'Centre'. Within the basic plan are two variations centred around the two different internal circulation concepts. Concept 1 involves the retention of Yonge Street as an arterial road and the development of a ring-road system to accommodate local access. In Concept 2, the ring-road system, operating as a one-way pair, would assume an arterial function while Yonge Street would accommodate site access and local traffic circulation. Both concepts are depicted schematically in Figure 2.

Of particular importance in this analysis is the distinction between the traffic-carrying function of the arterial road system, the access-providing function of the local and collector streets, and the protection and maintenance of each of these functions. Both traffic circulation concepts described here recognize and accommodate this distinction.

For each concept, traffic generated by future development in the 'Centre' was assigned to the road network and combined with existing (counted) traffic to produce the volume estimates summarized in Figure 3 (Concept 1) and Figure 4 (Concept 2). Analysis of the volume estimates indicate a need for the road network improvements discussed below and depicted in Figure 5 (Concept 1) or Figure 6 (Concept 2). Tables 2 and 3 summarize the results of a screenline analysis of traffic volume/capacity relationships for both Concept 1 (Table 2) and Concept 2 (Table 3).

The following road system improvements are identified as required to accommodate long-term development in the North Yonge Centre:

(1) Development of an Internal Traffic Circulation System
(2) Sheppard Avenue widening
(3) Finch Avenue Widening
(4) Bayview Avenue widening
(5) New road in HEPC Corridor

Each of these is described in detail in the following sections.

(1) DEVELOPMENT OF AN INTERNAL TRAFFIC CIRCULATION SYSTEM

As discussed above, two different concepts are possible which will allow the provision of access to existing and future development while ensuring the protection of existing traffic carrying capability. These are shown in Figure 2. It is noted that both concepts involved similar physical requirements but different operating characteristics and access control policies. A brief summary of the relative advantages of the two concepts follows the discussion.

Concept 1: Description

- o retain Yonge Street as an arterial road with the existing 7-lane cross-section. Direct driveway access to Yonge Street would not be permitted (unless no alternative exists) to preserve its traffic-carrying capability. Turning lanes would be provided when necessary where they do not already exist;

- o develop a two-way ring-road system generally following the boundary of the 'Centre which is intended to perform a local/collector function, accommodating direct site access and conveying traffic from the 'Centre' to the arterial road system. An ultimate 4-lane cross-section would generally be adequate incorporating turning lanes as required. West of Yonge Street, the ring-road would incorporate Beecroft Road with extensions south to Poyntz Avenue and north to Drewry Avenue (via Duplex Avenue). East of Yonge Street, the alignments of Doris Avenue (south of Church Avenue) and Kenneth Avenue (north of Church Avenue) would generally be followed with extensions south of Sheppard Avenue to connect in some manner with Yonge Street, and north to Cummer Avenue. The portions of the ring-road system north of Bishop Avenue/Hendon Avenue are important because they alleviate traffic conflicts with the present commuter parking kiss n'ride and the TTC bus activity in the Finch Station area and also because they represent an important alternative to Yonge Street for purposes of site access;

Several sections of this route do not currently exist but are essential system components towards providing efficient local circulation and site access, off-loading some shorter trips from Yonge Street, and diverting some turning movements from the critical Yonge/Sheppard and Yonge/Finch intersections. The extensions of Beecroft Road south to Poyntz Avenue and north to Ellerslie Avenue are presently being considered in the North York planning process. The extension of Doris Avenue south of Sheppard Avenue would be difficult and could conceivably be dispensed with (in Concept 1 only) provided that any high density development on the MacLean-Hunter site is supplied with an alternative access route to Sheppard Avenue (possibly via an access road connecting with Willowdale Avenue), and to Yonge Street (via Avondale Avenue or an extension of Bales Avenue to meet Yonge Street opposite Poyntz Avenue). With respect to this it is noted that the North York Council recently approved the retention of Marshall Macklin Monaghan Ltd. to develop a comprehensive traffic plan for the area based on the potential development of both the MacLean-Hunter lands and the Board of Education lands immediately to the east;

- o complete the internal circulation system by upgrading certain east-west connecting streets within the 'Centre' boundaries. These streets would generally be located where there are now signalized intersections with Yonge Street (i.e. Bishop Avenue/Hendon Avenue, Byng Avenue/Kempford Avenue, Church Avenue/Churchill Avenue, Park Home Avenue/Empress Avenue, North York Boulevard/Elmwood Avenue, Elmhurst Avenue/Greenfield Avenue, Poyntz Avenue) and would accommodate direct site access. These road improvements can generally be achieved through the development control process over an extended period of time.

Discussion:

- o the traffic volumes shown in Figure 3 indicate a specific need for a transfer of traffic, particularly shorter-distance trips, from Yonge Street to a parallel route;

- o as traffic volumes increase, Yonge Street will not be able to support additional direct site access and maintain its role as an arterial street;

- o certain parts of the 'Centre', among them the area between Bishop Avenue/Hendon Avenue and Cummer Avenue/Drewry Avenue presently have access opportunities only to Yonge Street. The ring-road described would provide a necessary direct access alternative;

- o the ring-road is designed to collect traffic generated by the 'Centre' and convey it to the arterial road system. If it is not implemented, severe congestion on Yonge Street and the connecting arterial roads would promote inappropriate and extensive infiltration of the adjacent residential neighbourhoods. Specifically in the long range, the ring-road is essential to protect the residential communities.

Concept 2: Description

- o allow Yonge Street to assume a local/collector function generally within the 'Centre'. Direct driveway access would be permitted and the cross-section could conceivably be reduced to 4-5 lanes. Traffic-carrying ability would be de-emphasized, concentrating instead on creating a "downtown" street environment;

- o implement a ring-road system operating as a one-way pair to assume the arterial function presently assigned to Yonge Street. The cross-section would likely consist of 3-4 lanes in each direction to accommodate turning movements and through traffic. Direct site access to the ring-road would be avoided wherever possible;

  The ring-road would follow generally the same alignment as described previously for Concept 1 except that special attention would be paid to continuity/smooth traffic flow at the terminii of the ring-road on Yonge Street north of Drewry Ave/Cummer Ave. and south of Poyntz Avenue. The extension of Doris Avenue south of Sheppard Avenue to connect with Yonge Street is a difficult but essential component of the ring-road in Concept 2;

- o as described in Concept 1, certain east-west streets would be upgraded within the 'Centre' to complete the internal grid system and provide additional opportunities for direct site access.

Discussion

- o Concept 2 represents an alternative to Concept 1 and as described, will fulfil the same roles and requirements. It is put forward as an alternative since it promotes the urban design aspects of Yonge Street as a "downtown " street.

Additional Notes for both Concepts

Of particular note are a number of specific improvements common to both Concept 1 and Concept 2 (except where noted):

1. jog eliminations:
   - Byng Avenue/Kemford Boulevard at Yonge Street;
   - North York Boulevard/Elmwood Avenue at Yonge Street;
   - Beecroft Road/Beecroft Road extension at Sheppard Avenue.

2. new traffic signals:
   - Yonge Street at Poyntz Avenue;
   - ring-road at Finch Avenue (east and west of Yonge Street);

3. examine the feasibility of a free-flow ramp from southbound Yonge Street to eastbound Highway 401.

4. provision of adequate access to the MacLean-Hunter site: - If additional development is provided on this site , access should be provided via connecting local streets to both Yonge Street and Sheppard Avenue. If this is not possible via the ring-road system (particularly in Concept 1 if the ring-road cannot be completed in the southeast quadrant of Yonge Street and Sheppard Avenue), it may be accomplished with an extension of Bales Avenue from the site to Yonge Street opposite Poyntz Avenue, and a new road connecting the site with Willowdale Avenue at its terminus south of Sheppard Avenue. It is expected that Marshall Macklin Monaghan will be addressing the question of traffic access to the MacLean-Hunter site as part of their development of a comprehensive traffic plan for this site.

5. traffic management measures:
   - if considered necessary, supplementary traffic management measures (i.e. loop roads, turn/entry restrictions, one-way roads and/or physical deterrents such as medians and islands) may be adopted by the City of North York to ensure minimization of the infiltration of adjacent residential neighbourhoods by 'Centre'-related traffic. Such measures could be implemented in conjunction with whichever transportation plan is adopted to ensure that in any particular area, the generated traffic demand can be accommodated at a satisfactory level of service and on appropriate routes such as arterial and collector roads.

Other minor operational improvements and road widenings may be required in addition to these described. Planning for these should be integrated with an ongoing monitoring program.

Comparison of Concept 1 and Concept 2

Both Concept 1 and Concept 2 will adequately perform the dual role of providing adequate local traffic circulation and site access while preserving the function of, and maintaining a satisfactory level-of-service on, the arterial road system. However there are a number of advantages specific to each Concept. These are listed below:

Concept 1 - Advantages

1. Concept 1 represents basically a continuation and extension of existing policies with respect to roadway classification and function. Yonge Street would retain its arterial function whereas

the ring-road system represents a continuation of the Beecroft Road concept i.e. a parallel service road to Yonge Street.

2. Concept 1 would be easier to implement than Concept 2 in several respects:

   (i) The portion of the ring-road south of Sheppard Avenue and east of Yonge Street could possibly be dispensed with (in Concept 1) if adequate access was provided to a redeveloped MacLean-Hunter site as discussed in the text;

   (ii) The treatments of the north and south terminii of the ring-road system are not as critical in Concept 1 with respect to roadway design and traffic operations;

   (iii) In Concept 1, the ring-road option does not in general require the high design standards necessary with Concept 2 due to the difference in function.

3. The timing of the completion of the ring-road system is not as crucial with Concept 1 as it is in Concept 2 due to the difference in function. In Concept 1, the implementation could proceed more or less as development proceeds. In Concept 2, implementation would be required much sooner.

Concept 2: Advantages

1. Concept 2 would permit the development of a more complete "downtown" environment along Yonge Street. The changes in function from arterial to collector and the possibility of narrowing Yonge Street are major contributing factors.

2. The one-way ring-road system in Concept 2 is more efficient from a traffic operations viewpoint (ease of turning movements, etc.) than the two-way system in Concept 1.

3. The arterial ring-road system in Concept 2 effectively separates the 'Centre' from the surrounding residential neighbourhoods.

Conclusions for Concept 1 and Concept 2.

Both Concepts 1 and 2 possess unique characteristics and advantages. The main advantages of Concept 1 stem primarily from the ease of implementation while those for Concept 2 revolve around the potential for creating a genuine "downtown" environment. Although Concept 2 offers a more attractive and innovative solution to the transportation needs identified, its implementation is considered to

be very difficult at best. Adoption of Concept 2 would require a strong and serious commitment for implementation from the City of North York, and even with such commitment the difficulties of implementation might wel. prove insurmountable. Accordingly, Concept 1 is favoured over Concept 2 because it would be much easier to implement.

(2) SHEPPARD AVENUE WIDENING

Description

- o widen Sheppard Avenue to provide a continuous 6-lane basic cross-section between W. R. Allen Road/Dufferin Street and Leslie Street (a 6-lane basic cross-section already exists east of Leslie Street);

- o construct a right-turn cutoff from eastbound Sheppard Avenue to southbound Bayview Avenue, including deceleration lane.

Discussion

- o this improvement was identified as necessary in Phase I of the analysis. The traffic volume estimates produced in Phase II (see Fig. 3,4) support this conclusion since they generally exceed the capacity of the existing 4-lane cross-section in the peak direction. To provide system continuity, it is recommended that the widening extend from W.R. Allen Road/Dufferin Street to Leslie Street;

- o increasing congestion on Highway No. 401 may result in some diversion of short and middle-distance trips to Sheppard Avenue;

- o congestion at the Yonge Street/Highway No. 401 interchange will result in some Highway No. 401 access traffic being diverted via Sheppard Avenue to alternate interchange locations;

- o depending upon the transit improvement scheme adopted, increased transit use of Sheppard Avenue is likely, requiring additional road space. However, there are a number of rapid transit options still being considered and a definitive conclusion is not possible at this time;

- o improvement of operating conditions on Sheppard Avenue will reduce the tendency for drivers to bypass arterial road congestion via the local road system.

(3) FINCH AVENUE WIDENING

Description:

- o widen Finch Avenue to provide a continuous 6-lane basic cross-section between W. R. Allen Road/Dufferin Street and Highway No. 404.

Discussion

- o this improvement was identified as necessary in Phase I of the analysis. The traffic volume estimates produced in Phase II (see Fig. 3,4) support this conclusion in that they generally exceed in the peak direction the capacity of the existing 4-lane basic cross-section from west of Bathurst Street to east of Bayview Avenue. To provide system continuity, it is recommended that the widening extend from W. R. Allen Road/Dufferin Street to Highway No. 404;

- o depending upon the transit improvement scheme adopted, increased transit use of Finch Avenue is likely, requiring additional road space. As in the case of Sheppard Avenue, a firm conclusion is not possible since transit plans have not yet been finalized;

- o improvement of operating conditions on Finch Avenue will reduce the tendency for drivers to bypass arterial road congestion via the local road system. Traffic management measures may be implemented to ensure that the residential communities are adequately protected.

(4) BAYVIEW AVENUE WIDENING

Description

- o widening Bayview Avenue to provide a continuous 6-lane basic cross-section between Steeles Avenue and Highway No. 401. Additional widening to accommodate merging and diverging lanes may be required between Sheppard Avenue and Highway No. 401.

Discussion

- o traffic volume estimates (see Fig. 3,4) indicate that the existing 4-lane basic cross-section is inadequate - in fact Bayview Avenue is currently operating at or near capacity levels in the peak direction during peak periods;

- o diversion of through traffic from Yonge Street to Bayview Avenue is inevitable due to anticipated congestion on Yonge Street;

- o diversion of Highway No. 401 access traffic from Yonge Street to Bayview Avenue is possible as a result of congestion on the arterial road system, particularly with respect to trips to and from points east of the 'Centre'.

(5) NEW ROAD IN HEPC CORRIDOR

Description

- o construct a new road in the HEPC corridor extending from Bishop Avenue in the vicinity of Yonge Street to Bayview Avenue or possibly to Leslie Street. The new road would have a 4-lane basic cross-section with 2 lanes possibly being reserved for exclusive transit use. The new road may follow the existing Bishop Avenue alignment to some extent. Traffic signals will likely be required at the intersection of the new road with Bayview Avenue.

Discussion

- o traffic volume estimates (Fig. 3) indicate a need for this road to service traffic with destinations northeast of the 'Centre';
- o this road would ease traffic pressure on Cummer Avenue, a basically residential street, and also on other adjacent residential streets;
- o the new road represents an alternative route for some T.T.C. and inter-regional buses currently using Yonge Street and Finch Avenue en route from the terminals adjacent to the Finch station to points north or east of the 'Centre'.

3.2 Sensitivity Analysis

The Phase II analysis discussed in this summary is predicated upon two key assumptions as outlined in Section 2.

(1) 60% transit modal split;
(2) Minimal net increase in "background' traffic; ie. any growth in background traffic is assumed to be offset by increases in transit use or vehicle occupancy among existing trips to and from or through the 'Centre'. Other offsetting factors include spreading of the peak hour and capacity constraints elsewhere on the road system.

A sensitivy analysis was conducted, evaluating the impact of modifications to these assumptions as follows:

(1) 40% transit modal split;
(2) 15% net increase in "background" traffic.

This analysis generated substantially higher traffic volume estimates than the base scenario, indicating that the road improvement scheme proposed above would be inadequate in the eventuality of the key assumptions of 60% modal split and minimal net increase in background traffic not being realized.

It is concluded, based on the sensitivity analysis, that a 60% transit modal split must be achieved if the 'Centre' is to develop to the levels of employment and population that would be permitted under the proposed revisions to the Official Plan. Is is essential therefore that policies and plans be adopted which will result in higher transit usage. These would include implementation of the transit and road requirements outlined in Section 3.0 and 4.0 and also policies including those outlined in Section 3.3 below which relate to the achievement of a 60 per cent. transit modal split.

3.3 Policy Issues

In addition to the roadway system improvements specified in Section 3 certain overall policy issues must be addressed. These include the following:

(1) Transit modal split:

Section 3.2 above outlined the scope of impacts expected if 60% transit modal split is not achieved. To achieve 60 per cent. level of transit use, it is necessary to review existing policies and formulate new policies where required which will make transit travel relatively more attractive than automobile travel. These should include:

- o a policy limiting the provision of employee parking in developments well served by transit. This may require the implementation of controls in commuter parking lots and adjacent residential neighbourhoods to minimize the use of these areas for employee parking;

- o policies encouraging the provision of direct and convenient access to the transit system from major developments. This may involve pedestrian concourses, direct subway station access, weather-protected pedestrian walks, etc;

- o improvement of local bus service within the 'Centre' to compensate for the relatively wide subway station spacing compared to that in the Downtown area. It is noted that the Park Home subway station was approved by the Metropolitan council on June 21, 1983,and further noted that the station has been declared exempt from an Environmental Assessment. Construction is expected to begin in 1985. A station at Park Home is expected to attract more riders to transit thereby reducing automobile use in the immediate area.

(2) Functional road hierarchy:

The road system is divided into functional categories, based on the intended role of a particular road type. Arterial roads are intended to fulfil a traffic-carrying role, local streets an access-providing role,

and collector roads a mixture of the two. For the overall road system to function at a satisfactory level-of-service, these functions must be recognized and protected.

One particular aspect of this issue is the inappropriate infiltration of residential neighbourhoods. As indicated in Section 3.1, supplementary traffic management measures (such as loop roads or turn/entry restrictions) may be adopted to limit such infiltration, but such measures should only be implemented in conjunction with the indicated roadway improvements to ensure that in any particular area, the generated traffic demand can be accommodated on appropriate routes and at a satisfactory level-of-service.

(3) Traffic monitoring program:

To ensure that the implementation of roadway system improvements keeps pace with the development of the 'Centre', an ongoing traffic monitoring program, perhaps related to the Metro Cordon Count, should be implemented and the traffic data analyzed on a regular basis.

4.0 Transit System Requirements

4.1 Description and Discussion of Required Improvements

It was estimated that approximately 17,900 additional outbound transit person trips will be generated by the mature 'Centre' assuming a 60% transit modal split. Only a small proportion of these can be accommodated within the existing capacity of the transit system - the majority must be accommodated through service improvements or the provision of new facilities. It should be noted here that although there is substantial surplus capacity in the southbound direction on the Yonge Street subway (in the p.m. peak period of travel), the estimated transit demands do not approach the subway capacity available.

The Phase I analysis was designed to consider four possible rapid transit system configurations as follows:

(1) No additional rapid transit facilities;
(2) A local rapid transit system located in the Finch Avenue/HEPC corridor
(3) A local rapid transit system located in the Sheppard Avenue corridor;
(4) An inter-regional rapid transit system located in the Finch Avenue/HEPC corridor.

In each case it was assumed that the rapid transit system would extend between, and be connected to, the Scarborough RT system in the east and an extended Spadina subway in the west. Other system configurations are possible, but the four analysed are considered to be representative of the more feasible alternatives. For the local rapid transit system, a stop spacing of 1-2 km and peak period service headways of less than 5 minutes

were assumed while the corresponding values for the inter-regional service were 4-5 km and 5-10 minutes. Specific technologies were not assumed, but could include ICTS, LRT and busway alternatives among others.

Figures 7-10 summarize the results of the transit trip assignments based on the four system configurations described above and using existing travel demand plus that generated by new development or redevelopment within the 'Centre'.

Based on the assignment of transit trips generated by the ultimate development of the North Yonge Centre to the various public transit services, the following conclusions were reached:

- To accommodate travel between the North Yonge Centre and areas to the **east**, the following alternative strategies were identified as being adequate:

  (1) a local rapid transit facility (minimum 7000-8000 passengers/hour capacity) within the Finch Avenue/HEPC corridor; or

  (2) a local rapid transit facility (minimum 6000-7000 passengers/hour capacity) within the Sheppard Avenue corridor in conjunction with enhancement of the Finch Avenue bus service, possibly involving the use of articulated buses; or

  (3) an inter-regional rapid transit facility (minimum 4000-5000 passengers/hour capacity) within the Finch Avenue/HEPC corridor in conjunction with enhancement of the Finch Avenue and Sheppard Avenue bus services. In both cases, the use of articulated buses, possibly with transit priority measures, would likely be required.

- Similarly, to accommodate travel to and from the **west**, the following alternative strategies are possible:

  (1) enhancement of the Sheppard Avenue and Finch Avenue bus services. The use of articulated buses would likely be necessary; or

  (2) a local rapid transit facility (minimum 4500-5500 passengers/hour capacity) within the Finch Avenue/HEPC corridor; or

  (3) a local rapid transit facility (minimum 3500-4500 passengers/hour capacity) within the Sheppard Avenue corridor; or

  (4) an inter-regional rapid transit facility (minimum 2500-3500 passengers/hour capacity) within the Finch Avenue/HEPC corridor.

It is noted that there may be transit system configurations apart from those discussed which satisfy the identified requirements.

Generally, the local rapid transit systems were found to be more effective than the inter-regional system. Comparison of the alternative major transit alignments did not yield a dominant overall favourite in terms of service effectiveness. The Sheppard Avenue and Finch Avenue alignments are quite similar except that the Sheppard Avenue alignment provides more direct access to the principal development node in the 'Centre'. The H.E.P.C. corridor alignment would allow easier implementation and more scope for station and commuter parking facilities but at the cost of a location more remote from the road system and the apparent infeasibility of redeveloping lands adjacent to the corridor to a suitably high density.

Increases in bus service frequency on the remaining surface routes would be required but, in general, the increases would not result in frequencies beyond practical limits for operation in mixed traffic (60 buses/hour).

Other suggested improvements would include the rearrangement of surface transit routes and terminal operations as required to provide an efficient feeder system to the subway stations and potential rapid transit facilities.

Such rearrangement would also be designed to make best use of the proposed new roadway in the HEPC corridor. A shuttle bus service or expansion of T.T.C. bus service would be desirable within the 'Centre' area to offset the relatively wide subway station spacing.

The transit analysis described here does not account for growth in existing travel and assumes a 60% transit modal split among trips generated by growth in the 'Centre'; the requirements for transit system improvements could vary accordingly. No sensitivity analysis was conducted since a higher modal split than 60% is unlikely, and the rapid transit system improvements identified have sufficient flexibility to accommodate a reasonable variation in demand and allocation between the various transit services and facilities.

The Phase II analysis was focussed primarily on traffic circulation but several transit-oriented issues did arise:

(1) The existing bus terminals at the Sheppard and Finch subway stations cannot support significant increases in bus and passenger volumes. Furthermore, bus movement between the terminals and the street system affects and is affected by on-street traffic flow. Serious consideration should be given to redesign of the bus terminals, possibly including grade separation of the loading area and ramped access to avoid difficult left-turn movements;

(2) The new roadway proposed for the H.E.P.C. corridor may be suitable for use by buses on certain routes including portions of the T.T.C. and inter-regional services;

(3) Detailed consideration of bus operations was not included in this analysis and further analysis by T.T.C. staff is desirable.

5.0 Implementation and Phasing

5.1 Phasing of Transportation System Improvements

The roadway and transit system improvements described in Sections 3 and 4 are associated with mature development of the 'Centre'. A complete phasing plan for the implementation of the recommended improvement scheme is not practical since the rate and timing of development and redevelopment are not clearly defined. However, consideration of the interim levels of development described in Section 1.0 provides some indication of the relationship between the level of development and the adequacy of the transportation system. The outline below indicates, with respect to the interim levels of development, the various stages of transportation system improvement required to accommodate generated travel demand.

(1) **Long term:** - incorporates transportation system improvements required to accommodate mature development of the 'Centre' as provided for in OPA D-11-48 as amended and the modifications proposed in the April 1983 review by North York staff.

Roadway System Requirements:

- o roadway system improvements required to accommodate mature development of the 'Centre' are described fully in Section 3 and depicted in Figures 5 (Concept 1) and 6 (Concept 2).

Transit System Requirements:

- o transit system improvements required to accommodate mature development of the 'Centre' are described fully in Section 4.

(2) **Medium term:** - incorporates transportation system improvements required to accommodate the land use provision of OPA D-11-48 as amended. It is noted that the transportation system required in the medium term is very similar to that required for mature (long-term) development of the 'Centre'.

Roadway System Requirements

- o these are basically similar to the improvements described for long-term development except that the proposed new road in the H.E.P.C. corridor is not essential. It is noted that due to the modal split assumptions used, the total number of outbound vehicle trips generated by the 'Centre' during the afternoon peak hour is only some 17% less for this medium-term case than it is for the ultimate case.

Transit System Requirements:

- o the transit system improvements associated with long-term development are also applicable to the medium term except that the the travel demand to/from the east could conceivably be accommodated through extensive improvements to the surface transit system including reserved bus lanes, articulated vehicles, and/or transit priority measures. However, it is recognized that a rapid transit system would likely be required both east and west of Yonge Street to accommodate through traffic resulting from growth in other areas of the Metropolitan region. North York Council has endorsed such an east-west transit line.

(3) **Short term:** - incorporates transportation system improvements required to accommodate development proposals approved to June 1984.

Roadway System Requirements

- o ongoing implementation of ring-road system to maintain adequate site access and local traffic circulation;
- o widening of Sheppard Avenue between W. R. Allen Road/Dufferin Street and Highway 404;
- o right-turn cut-off from eastbound Sheppard Avenue to southbound Bayview Avenue;
- o widening of Bayview Avenue between Highway 401 and Sheppard Avenue to 6-lane basic cross-section plus turning lanes and merge/diverge lanes;
- o feasibility analysis of free-flow ramp from southbound Yonge Street to eastbound Highway No. 401.

Transit System Requirements

- o estimated transit demand could be accommodated through improvements to surface transit service possibly including reserved bus lanes, articulated vehicles and/or transit priority measures. A rapid transit system would not likely be required;

- o bus terminals at the Finch and Sheppard Stations may require design improvements. Planning and implementation of any improvements however, will have to await a decision on the location and technology of the Sheppard/Finch transit line presently under study.

5.2 Implementation Issues

There a number of general implementation issues which should be addressed.

(1) Detailed planning, including the preparation of appropriate Official Plan amendments and property acquisition for the necessary

improvements should be initiated immediately due to the time frame required for these activities;

(2) It is essential that the arterial traffic-carrying capability currently supplied by Yonge Street is maintained continuously. In terms of Concept 1, this implies that the ring-road system and the internal east-west streets be developed as required to supply direct site access to redevelopment and new development. Direct access to Yonge Street should not be provided in such cases. In terms of Concept 2, the ring-road system must be operational as an arterial road before the ability of Yonge Street to carry traffic is significantly degraded through the provision of site access or through a reduction in cross-section. A decision between Concept 1 and Concept 2 should be made at the earliest opportunity to facilitate this process through appropriate measures;

(3) In conjunction with the road improvements described in previous sections, supplementary traffic management measures (such as loop roads, turn/entry restrictions, one way roads and/or physical deterrents such as medians and islands), may be desired to protect against inappropriate traffic intrusion into residential neighbourhoods adjacent to the 'Centre'. The planning of such measures should ensure that in any particular area, travel patterns are not disrupted before suitable provision has been made to accommodate displaced traffic on alternate routes. An adequate level-of-service should be maintained at all times.

The timing of specific individual improvements will best be determined through the recommended traffic-monitoring program. However, their implementation must be timed so that the traffic-carrying ability of the road network is not impaired, while at the same time, appropriate access can be provided as required to new development and redevelopment projects.

5.3 Costs

Costs for four of the major elements of the road system improvements identified in Section 3.0 above are shown in Table 4. Total costs for the widening of Sheppard Avenue, Finch Avenue, Bayview Avenue and the provision of the new road in the HEPC corridor are estimated at $66.8 million. These estimates include construction and property costs.

The completion of an internal traffic circulation system as described in Section 3.0 above, will require the provision of approximately 2.7 km of new road links for Concept 1 and 3.5 km for Concept 2; these new links represent 30 per cent. and 36 per cent. respectively of the total road system proposed. In addition both Concepts would require the widening of about 5.6 km of road from 2 to 4 lanes and some jog eliminations.

Total costs for the new road links, the road widenings and the jog eliminations are estimated at approximately $5.5 million for Concept 1 and $6.1 million for Concept 2. These estimates are preliminary and should be considered as "order-of-magnitude" only. Although property costs for both concepts are not available, it seems likely that these would be substantially higher than the construction costs even though some of the property could be acquired at no cost to the City through the Development Control process.

For the transit system improvements, no costs have been assigned. While the capital cost of an east/west transit line extending from Dufferin Street to the Scarborough City Centre could range from approximately $350 million for a busway to over $1 billion for a full subway line, the total cost of any such line should not be attributed to the needs of the North Yonge Centre. Other relatively minor transit costs would be incurred for upgrading the Finch and/or Sheppard subway stations to improve the bus access.

TABLE 1

SUMMARY OF LAND USE AND TRAVEL DEMAND DATA

LEVEL OF DEVELOPMENT	POPULATION	EMPLOYMENT	ADDITIONAL GENERATED P.M. PEAK HOUR OUTBOUND TRAVEL DEMAND		MODAL SPLIT ASSUMPTIONS		
			TRANSIT PERSON TRIPS	AUTOMOBILE VEHICLE TRIPS	TRANSIT	AUTOMOBILE	WALK/OTHER
1. Existing situation	4,500	13,500	--	--	15-25	70-80	0-5
2. Short-term future - existing land use plus approved proposals to June 1984	7,200	28,700	3,200	3,300	40	56	4
3. Medium-term future - incorporates land use provisions of the North Yonge Centre Plan (OPA D-11-48) amended through June 1984	21,100	48,200	9,600	5,900	50	43	7
4. Long-term future - incorporates land use provisions of the North Yonge Centre Plan (OPA D-11-48) amended through June 1984 and including the provisions proposed in the April 1983 review of this plan	28,900	66,000	17,900	7,100	60	33	7

TABLE 2
SCREENLINE ANALYSIS
CONCEPT 1

	NB/EB Capacity	SB/WB Capacity	- 60% Transit Modal Split - Minimal growth in background traffic NB/EB Volume	NB/EB V/C	SB/WB Volume	SB/WB V/C	- 40% Transit Modal Split - 15% growth in background traffic NB/EB Volume	NB/EB V/C	SB/WB Volume	SB/WB V/C
E-W Screenlines							(UNADJUSTED VOLUMES)			
A: Bathurst	2,000	1,500	1,800	0.90	1,300	0.87	2,200	1.10	1,400	0.93
Yonge	3,000	2,250	2,600	0.87	1,600	0.71	3,200	1.07	2,200	0.98
Ring-Road	3,000	3,000	1,400	0.47	1,200	0.40	1,800	0.60	1,200	0.40
Bayview	3,000	2,250	2,100	0.70	1,500	0.67	2,700	0.90	1,600	0.71
Total North of Finch	11,000	9,000	7,900	0.72	5,600	0.62	9,900	0.90	6,400	0.71
B: Bathurst	1,500	2,000	1,600	1.07	1,200	0.60	1,800	1.20	1,300	0.65
Yonge	2,250	3,000	2,700	1.20	1,600	0.53	3,600	1.60	2,200	0.73
Ring-Road	3,000	3,000	2,200	0.73	1,400	0.47	3,100	1.03	1,700	0.57
Bayview	2,250	3,000	1,500	0.67	1,500	0.50	1,800	0.80	1,600	0.53
Total South of Finch	9,000	11,000	8,000	0.89	5,700	0.52	10,300	1.14	6,800	0.62
C: Bathurst	2,000	1,500	1,600	0.80	1,100	0.73	2,000	1.00	1,200	0.80
Yonge	3,000	2,250	2,100	0.70	2,300	1.02	2,900	0.97	2,500	1.11
Ring-Road	3,000	3,000	2,400	0.80	2,500	0.83	3,500	1.17	4,000	1.33
Bayview	3,000	2,250	2,000	0.67	1,300	0.58	2,400	0.80	1,300	0.58
Total North of Sheppard	11,000	9,000	8,100	0.74	7,200	0.80	10,800	0.98	9,000	1.00
D: Bathurst	1,500	2,000	1,600	1.07	1,100	0.55	1,700	1.13	1,100	0.55
Yonge	3,000	3,000	3,100	1.03	3,000	1.00	4,800	1.60	4,800	1.60
Bayview	2,250	3,000	2,700	1.20	2,900	0.97	3,800	1.69	3,600	1.20
Total South of Sheppard	6,750	8,000	7,400	1.10	7,000	0.88	10,300	1.53	9.500	1.19
N-S Screenlines										
E: Steeles	2,000	1,500	1,300	0.65	1,400	0.93	1,500	0.75	1,700	1.13
Finch	3,000	2,250	1,800	0.60	1,900	0.84	2,100	0.70	2,500	1.11
Sheppard	3,000	2,250	1,600	0.53	1,600	0.71	1,200	0.40	1,300	0.58
Total East of Bathurst	8,000	6,000	4,700	0.59	4,900	0.82	4,800	0.60	5,500	0.92
F: Steeles	1,500	2,000	1,400	0.93	1,200	0.60	1,500	1.00	1,300	0.65
Finch	2,250	3,000	1,400	0.62	1,000	0.33	1,600	0.71	1,100	0.37
Sheppard	2,250	3,000	1,700	0.76	1,200	0.40	2,200	0.98	1,600	0.53
Total West of Yonge	6,000	8,000	4,500	0.75	3,400	0.43	5,300	0.88	4,000	0.50
G: Steeles	2,000	1,500	1,200	0.60	1,100	0.73	1,400	0.70	1,200	0.80
Finch	3,000	2,250	1,500	0.50	900	0.40	1,800	0.60	1,000	0.44
Sheppard	3,000	2,250	1,400	0.47	1,500	0.67	1,600	0.53	2,000	0.89
Total East of Yonge	8,000	6,000	14,100	0.51	3,500	0.58	4,800	0.60	4,200	0.70
H: Steeles	1,500	2,000	1,500	1.00	1,300	0.65	1,700	1.13	1,500	0.75
Finch	2,250	3,000	1,800	0.80	800	0.27	2,400	1.07	900	0.30
Sheppard	2,250	3,000	3,000	1.33	1,800	0.60	4,200	1.87	2,400	0.80
Total West of Bayview	6,000	8,000	6,300	1.05	3,900	0.49	8,300	1.38	4,800	0.60

NOTES: (1) SCREENLINE ANALYSIS INCLUDES RECOMMENDED IMPROVEMENTS
(2) SEE FIGURE 11 FOR SCREENLINE LOCATIONS

TABLE 3
SCREENLINE ANALYSIS
CONCEPT 2

	NB/EB Capacity	SB/WB Capacity	- 60% Transit Modal Split - Minimal growth in background traffic NB/EB Volume	NB/EB V/C	SB/WB Volume	SB/WB V/C	- 40% Transit Modal Split - 15% growth in background traffic NB/EB Volume	NB/EB V/C	SB/WB Volume	SB/WB V/C
E-W Screenlines							(UNADJUSTED VOLUMES)			
A: Bathurst	2,000	1,500	1,700	0.85	1,300	0.87	2,000	1.00	1,500	1.00
Yonge	1,500	1,500	1,500	1.00	1,200	0.80	2,900	1.93	2,200	1.47
Ring-Road	3,000	2,250	2,300	0.77	1,100	0.49	2,100	0.70	1,000	0.44
Bayview	3,000	2,250	2,300	0.77	1,500	0.67	2,700	0.90	1,600	0.71
Total North of Finch	9,500	7,500	7,800	0.82	5,100	0.68	9,700	1.02	6,300	0.84
B: Bathurst	1,500	2,000	1,600	1.07	1,300	0.65	1,800	1.20	1,300	0.65
Yonge	1,500	1,500	1,500	1.00	1,400	0.93	3,000	2.00	2,400	1.60
Ring-Road	2,250	3,000	3,100	1.38	1,400	0.47	3,400	1.51	1,300	0.43
Bayview	2,250	3,000	1,300	0.58	1,500	0.50	1,600	0.71	1,600	0.53
Total South of Finch	7,500	9,500	7,500	1.00	5,600	0.59	9,800	1.31	6,600	0.69
C: Bathurst	2,000	1,500	1,700	0.85	1,100	0.73	2,000	1.00	1,200	0.80
Yonge	1,500	1,500	1,500	1.00	1,400	0.93	3,500	2.33	3,100	2.07
Ring-Road	3,000	2,250	3,000	1.00	3,100	1.38	2,300	0.77	3,200	1.42
Bayview	3,000	2,250	1,800	0.60	1,300	0.58	2,100	0.70	1,300	0.58
Total North of Sheppard	9,500	7,500	8,000	0.84	6,900	0.92	9,900	1.04	8,800	1.17
D: Bathurst	1,500	2,000	1,600	1.07	1,100	0.55	1,700	1.13	1,100	0.55
Yonge	3,000	3,000	3,200	1.07	3,000	1.00	4,800	1.60	4,800	1.60
Bayview	3,000	3,000	2,800	0.93	2,900	0.97	3,800	1.27	3,600	1.20
Total South of Sheppard	7,500	8,000	7,600	1.01	7,000	0.88	10,300	1.37	9,500	1.19
N-S Screenlines										
E: Steeles	2,000	1,500	1,300	0.65	1,500	1.00	1,500	0.75	1,900	1.27
Finch	3,000	2,250	1,800	0.60	1,700	0.76	2,200	0.73	2,200	0.98
Sheppard	3,000	2,250	1,500	0.50	1,700	0.76	1,200	0.40	1,500	0.67
Total East of Bathurst	8,000	6,000	4,600	0.58	4,900	0.82	4,900	0.61	5,600	0.93
F: Steeles	1,500	2,000	1,300	0.87	1,200	0.60	1,500	1.00	1,300	0.65
Finch	2,250	3,000	1,400	0.62	1,300	0.43	1,600	0.71	1,700	0.57
Sheppard	2,250	3,000	2,000	0.89	1,300	0.43	2,400	1.07	1,300	0.43
Total West of Yonge	6,000	8,000	4,700	0.78	3,800	0.48	5,500	0.92	4,300	0.54
G: Steeles	2,000	1,500	1,200	0.60	1,100	0.73	1,400	0.70	1,200	0.80
Finch	3,000	2,250	1,100	0.37	1,100	0.49	1,300	0.43	1,300	0.58
Sheppard	3,000	2,250	2,300	0.77	1,000	0.44	2,800	0.93	1,100	0.49
Total East of Yonge	8,000	6,000	4,600	0.58	3,200	0.53	5,500	0.69	3,600	0.60
H: Steeles	1,500	2,000	1,500	1.00	1,300	0.65	1,700	1.13	1,500	0.75
Finch	2,250	3,000	1,500	0.67	700	0.23	2,600	1.16	900	0.30
Sheppard	2,250	3,000	2,900	1.29	1,800	0.60	4,000	1.78	2,400	0.80
Total West of Bayview	6,000	8,000	5,900	0.98	3,800	0.48	8,300	1.38	4,800	0.60

NOTES: (1) SCREENLINE ANALYSIS INCLUDES RECOMMENDED IMPROVEMENTS (INCLUDING NARROWING OF YONGE STREET)
(2) SEE FIGURE 11 FOR SCREENLINE LOCATIONS

TABLE 4

ARTERIAL ROAD WIDENINGS
COST ESTIMATES
($ millions)

Roadway Section	Construction Costs	Property Costs	Contingencies (20%)	Total Cost
Bayview Avenue[1] Hwy.401 to Steeles Ave.	6.8	2.7	1.9	11.4
New Road in HEPC R.O.W.[2] Yonge St. to Bayview Ave.	2.0	0.2 (annual rent)	0.4 plus 0.05 annually	2.4 plus 0.25 annually
Finch Avenue[3] Dufferin St. to Hwy.404	17.7	4.1	4.4	26.2
Sheppard Avenue[4] W.R.Allen Rd. to Leslie St.	16.4	5.9	4.5	26.8

Notes:

1. Construction costs included widening of bridge over Don River, south of Steeles Avenue. R.O.W. between Steeles and Finch is already 36 metres.

2. East of Willowdale Avenue, road to be re-aligned within the Hydro R.O.W; lands to be leased from Ontario Hydro.

3. Existing R.O.W's between Bayview Avenue and Highway 404 and between Dufferin Street and Bathurst Street are basically 36 metres wide.

4. 36 metre R.O.W. exists between Bayview Avenue and Highway 404, 6-7 lane cross-section exists between Leslie Street and Highway 404. Construction cost includes widening at bridge over the West Branch of the Don River, east of Bathurst Street.

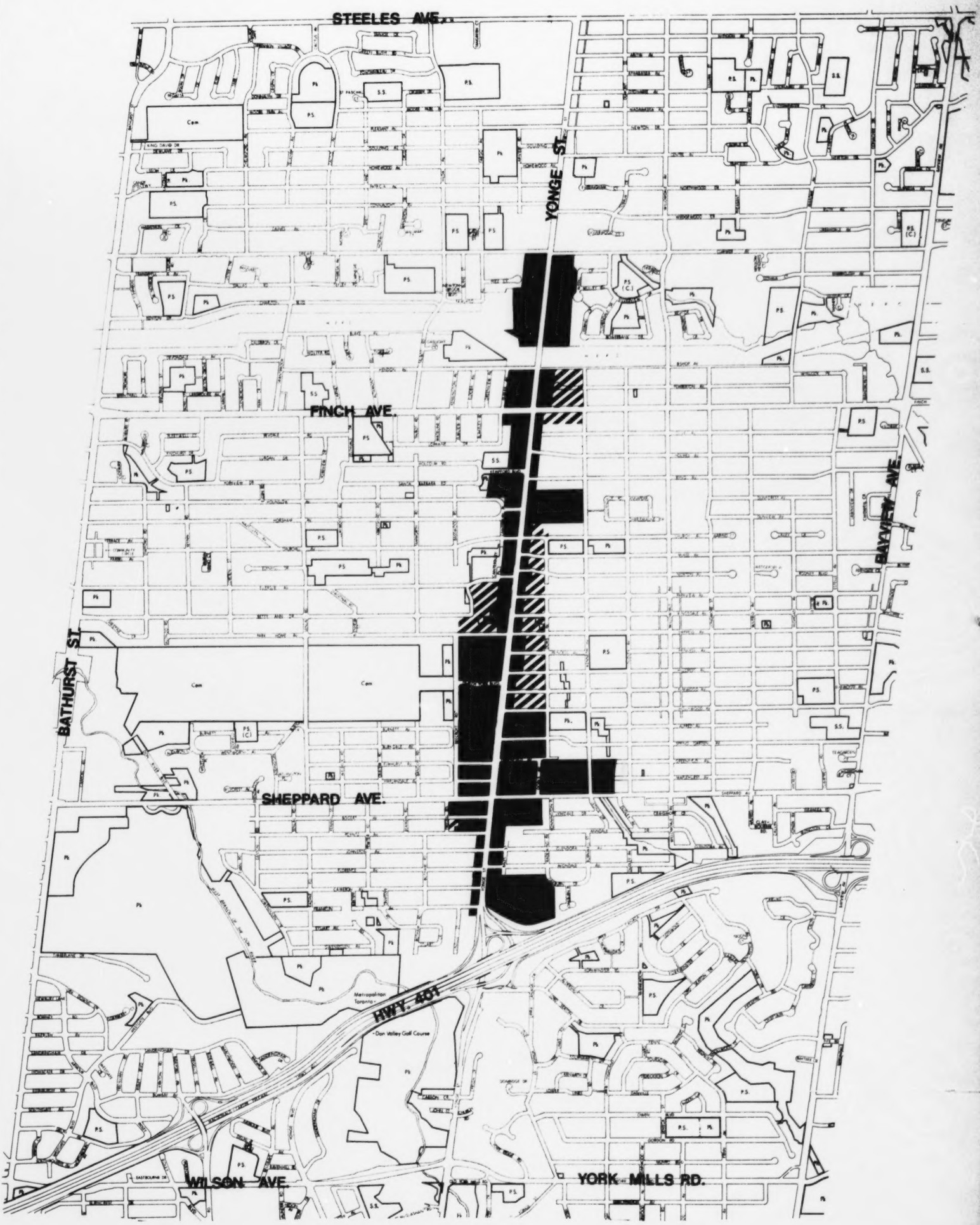
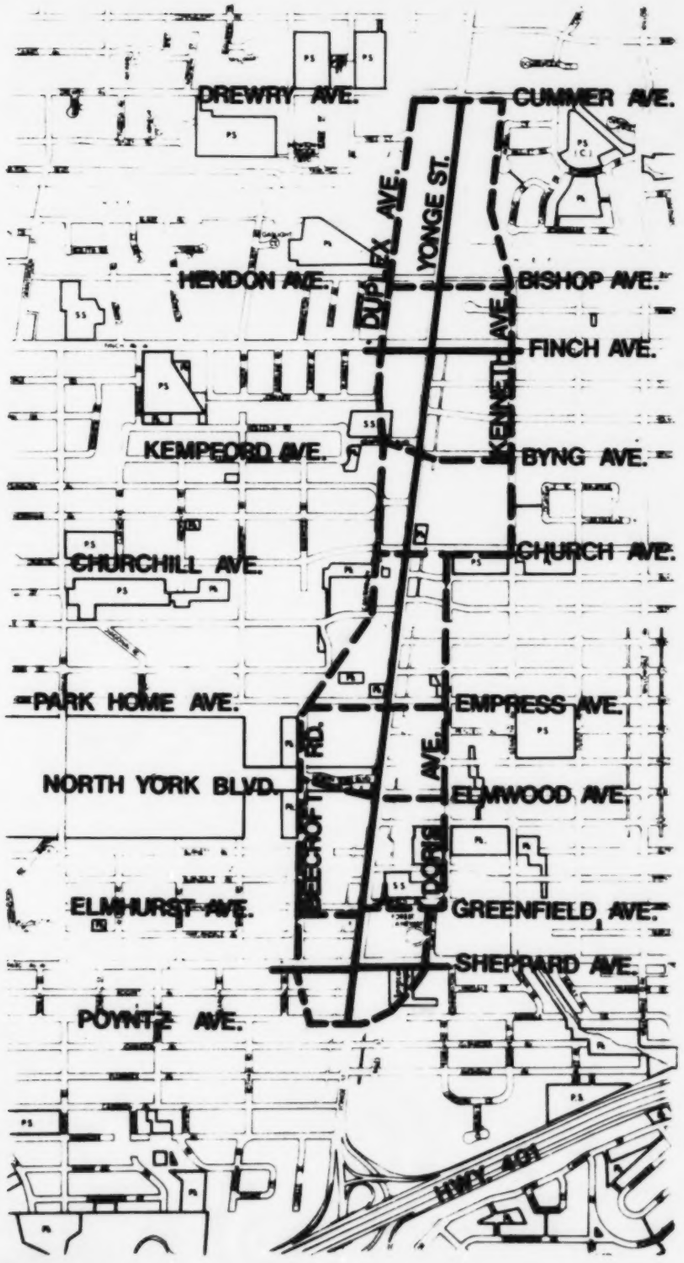
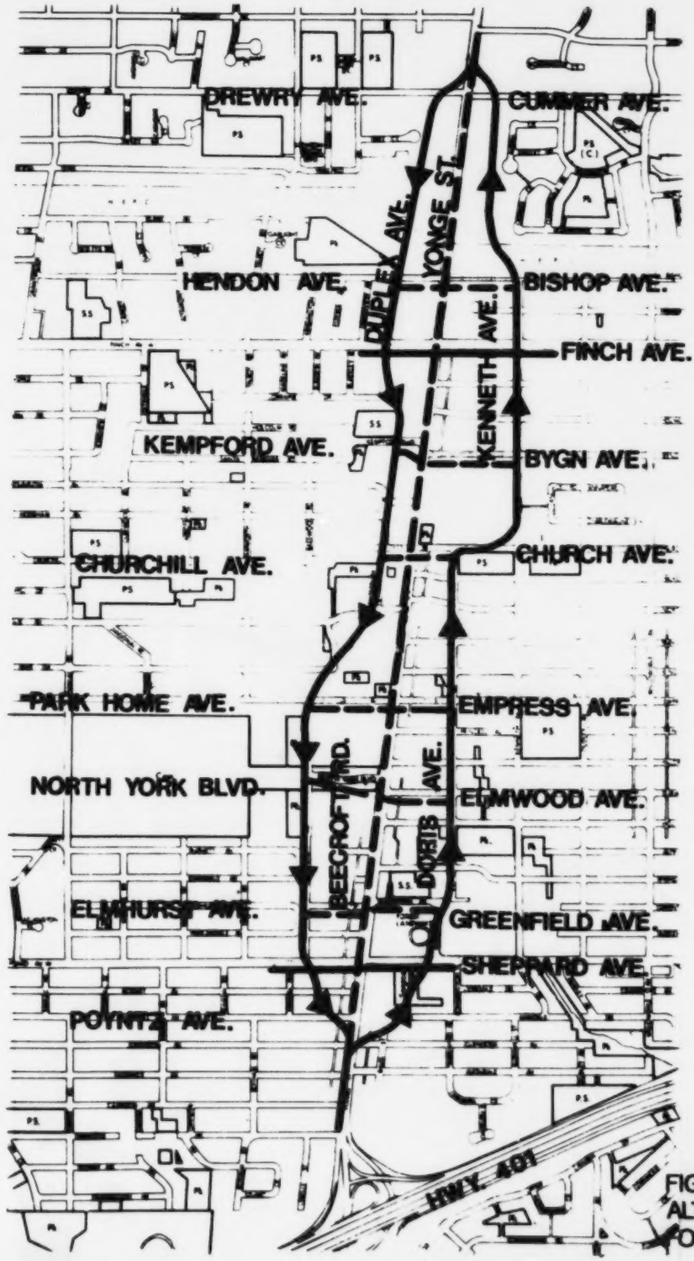


FIGURE 1
STUDY AREA



CONCEPT 1
YONGE STREET AS ARTERIAL;
TWO WAY RING ROAD FOR LOCAL/SERVICE FUNCTION

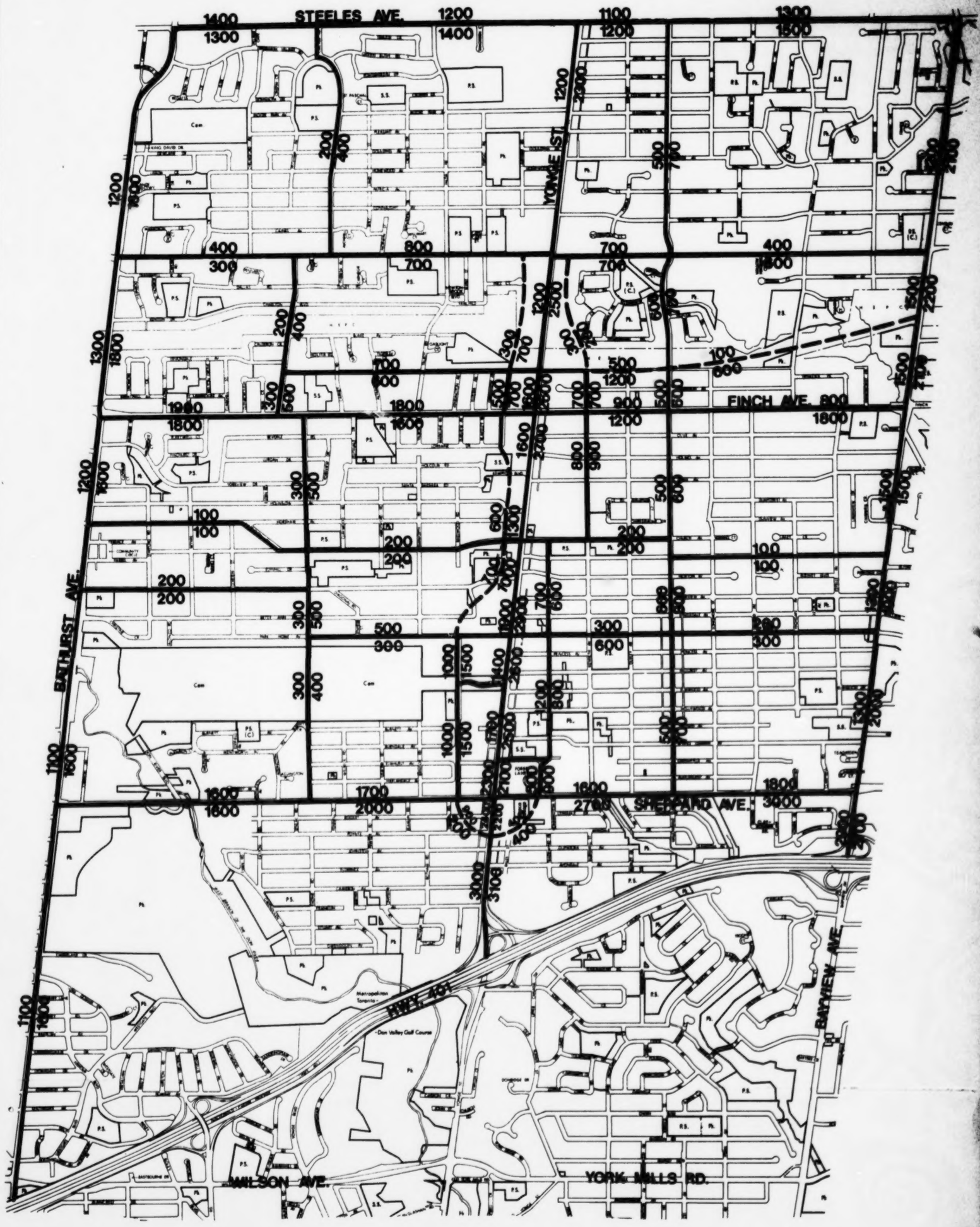


CONCEPT 2
YONGE STREET WITH LOCAL/SERVICE FUNCTION;
RING ROAD AS ONE WAY ARTERIAL

(Not to Scale)

ROAD FUNCTIONS
- Arterial
- Local/Service

FIGURE 2
ALTERNATIVE CONCEPTS
FOR INTERNAL CIRCULATION



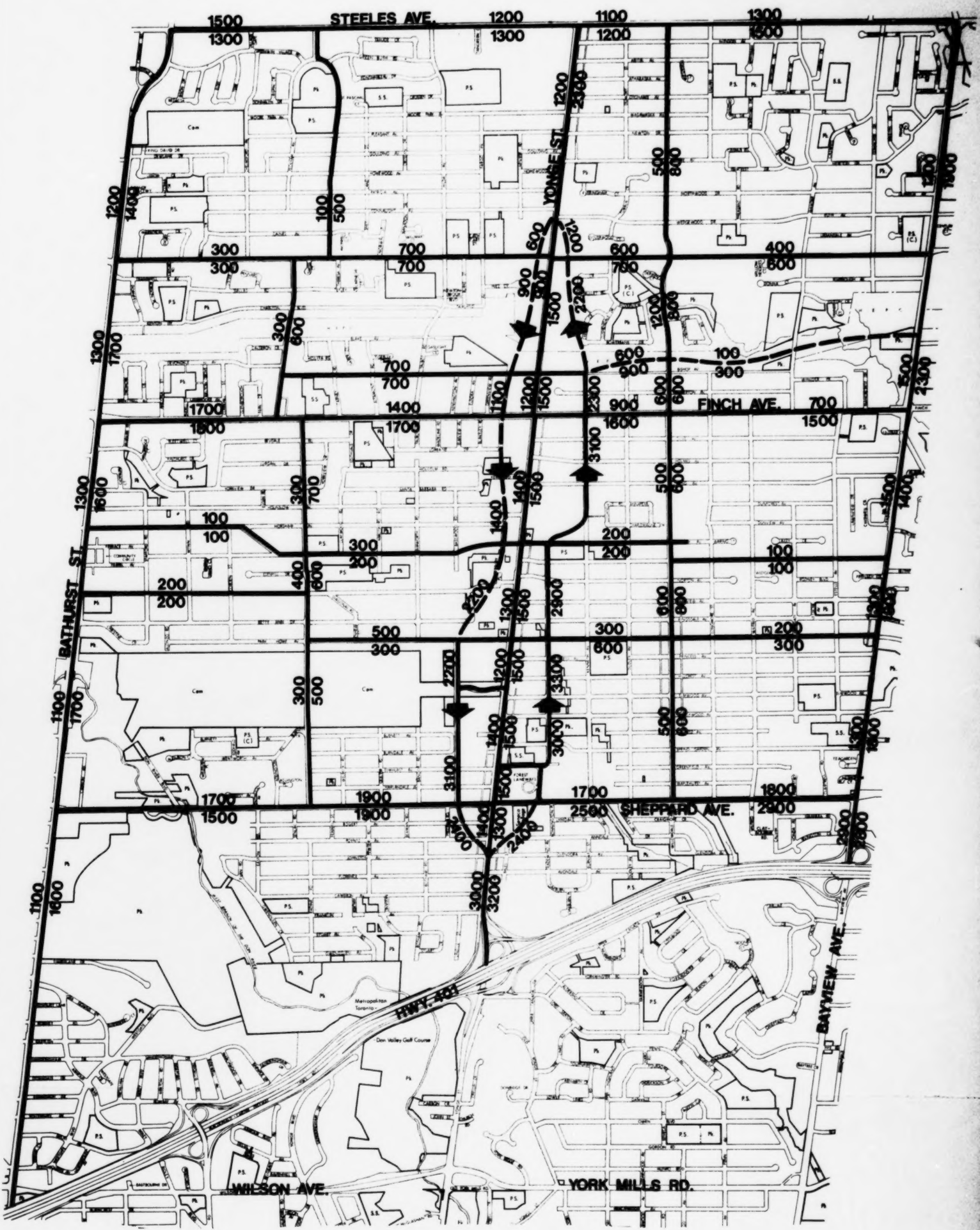
Existing Roads ——

Proposed Roads — — —

(Not to Scale)

ULTIMATE LEVEL OF DEVELOPMENT:
Employment – 66,000
Population – 28,900
Transit Modal Split - 60%

FIGURE 3
PROJECTED TRAFFIC VOLUMES
P.M. PEAK HOUR
CONCEPT 1



Existing Roads ——

Proposed Roads — — —

(Not to Scale)

FIGURE 4
PROJECTED TRAFFIC VOLUMES
P.M. PEAK HOUR
CONCEPT 2

ULTIMATE LEVEL OF DEVELOPMENT:
Employment – 66,000
Population – 28,900
Transit Modal Split = 60%

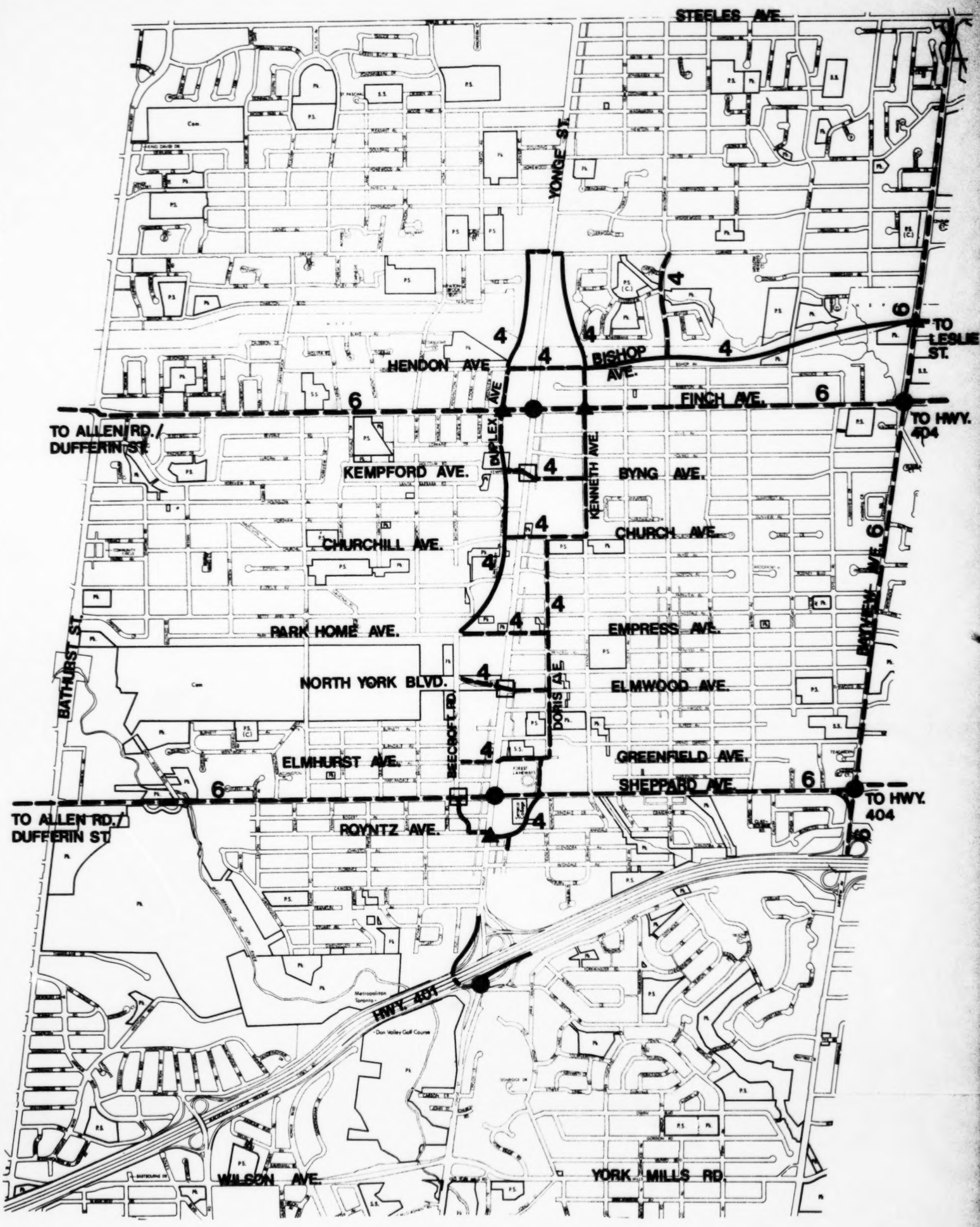
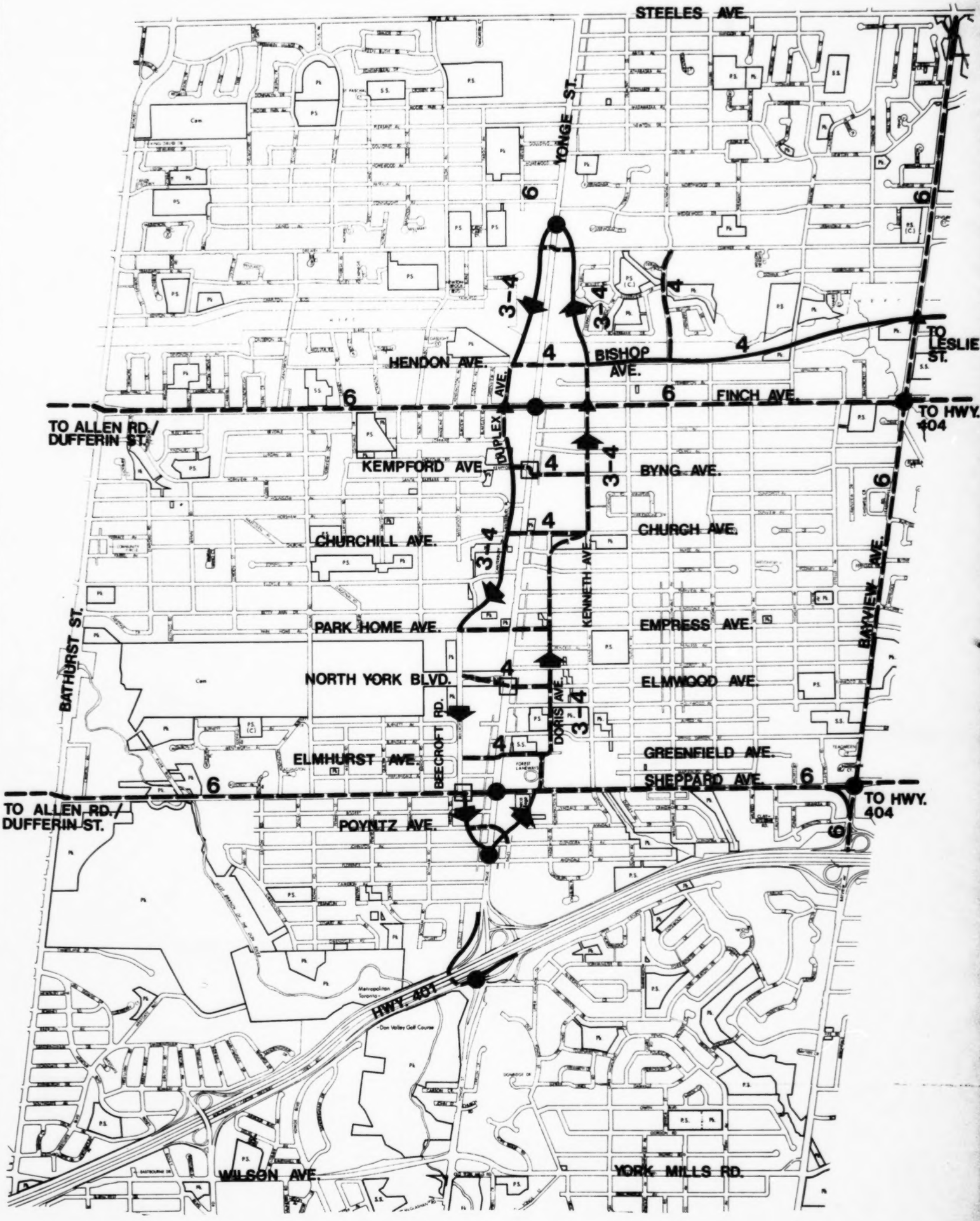


FIGURE 5
ROADWAY IMPROVEMENT REQUIREMENTS
CONCEPT 1



(Not to Scale)

(Number of Lanes)
New Road Link

Road Widening

Major Intersection Improvement

New Traffic Signal

Jog Elimination

(NOTE: Alignments Approximate Only)

FIGURE 6
ROADWAY IMPROVEMENT REQUIREMENTS
CONCEPT 2

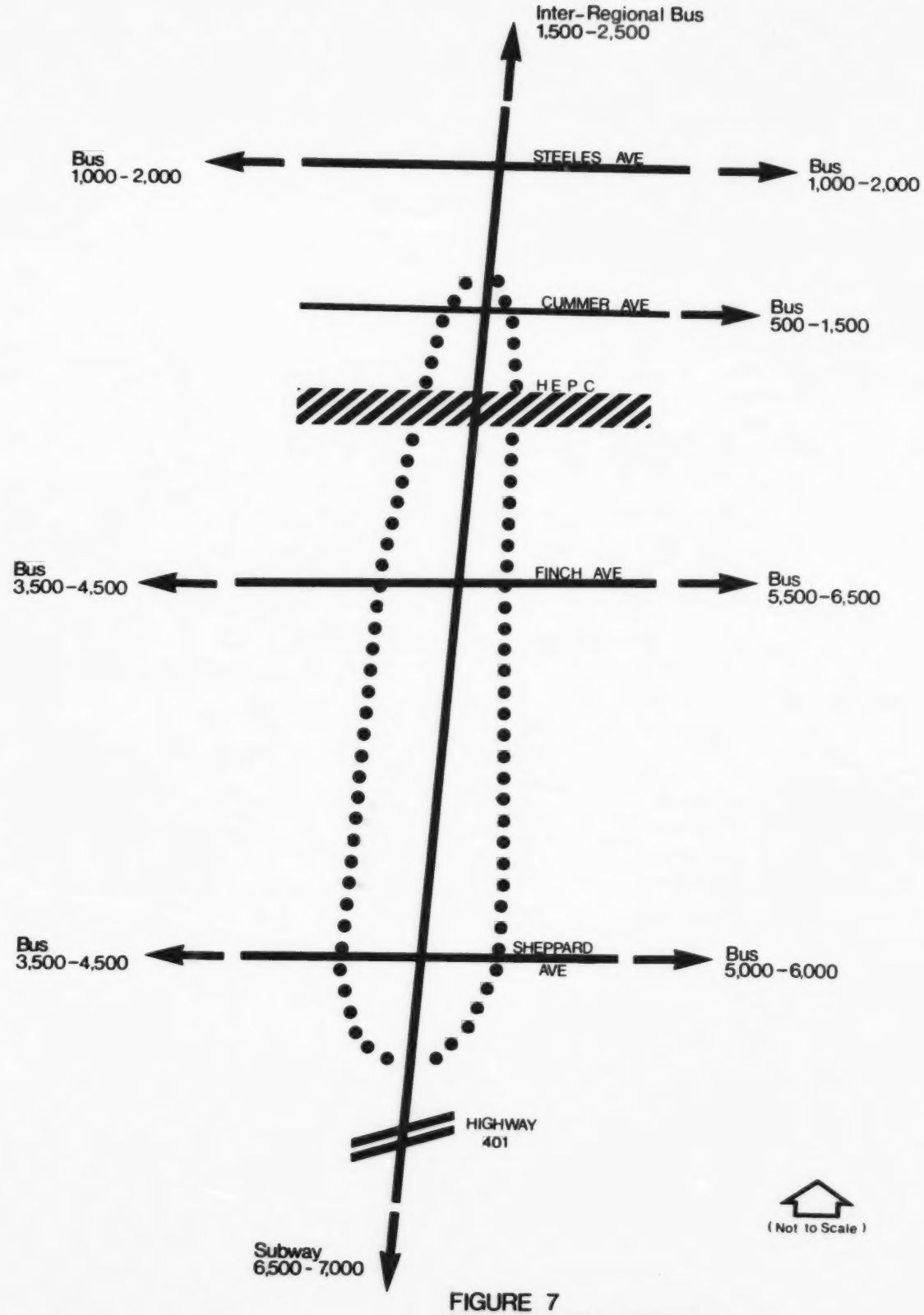


FIGURE 7
NORTH YONGE CENTRE
TRANSIT SYSTEM DEMAND
SCENARIO 1 :
NO RAPID TRANSIT FACILITIES

LEGEND
3,500-4,500 : Outbound p.m.
peak hour transit passengers

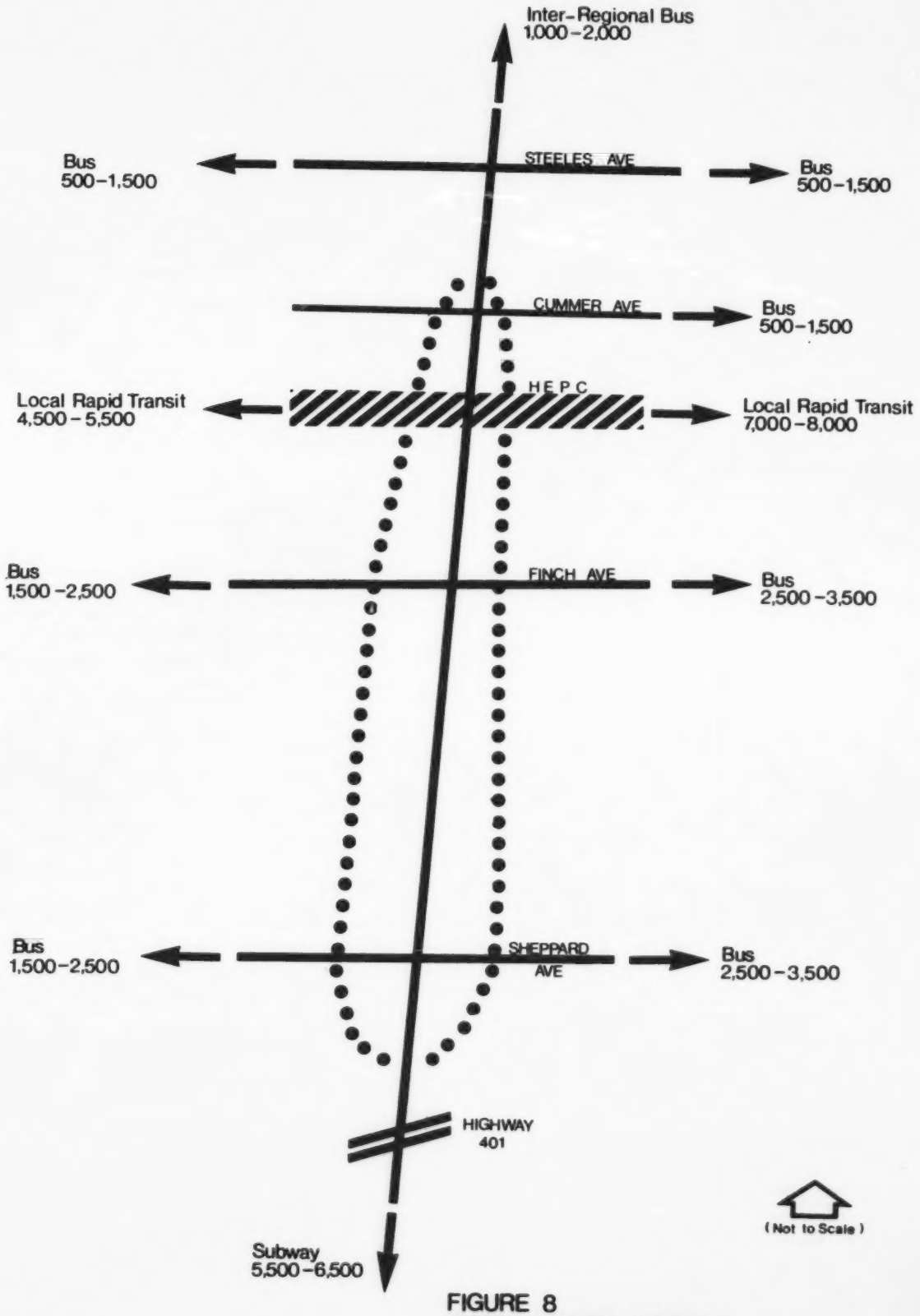


FIGURE 8
NORTH YONGE CENTRE
TRANSIT SYSTEM DEMAND
SCENARIO 2 :
FINCH/HEPC LOCAL RAPID TRANSIT

LEGEND
3,500-4,500 : Outbound p.m. peak hour transit passengers

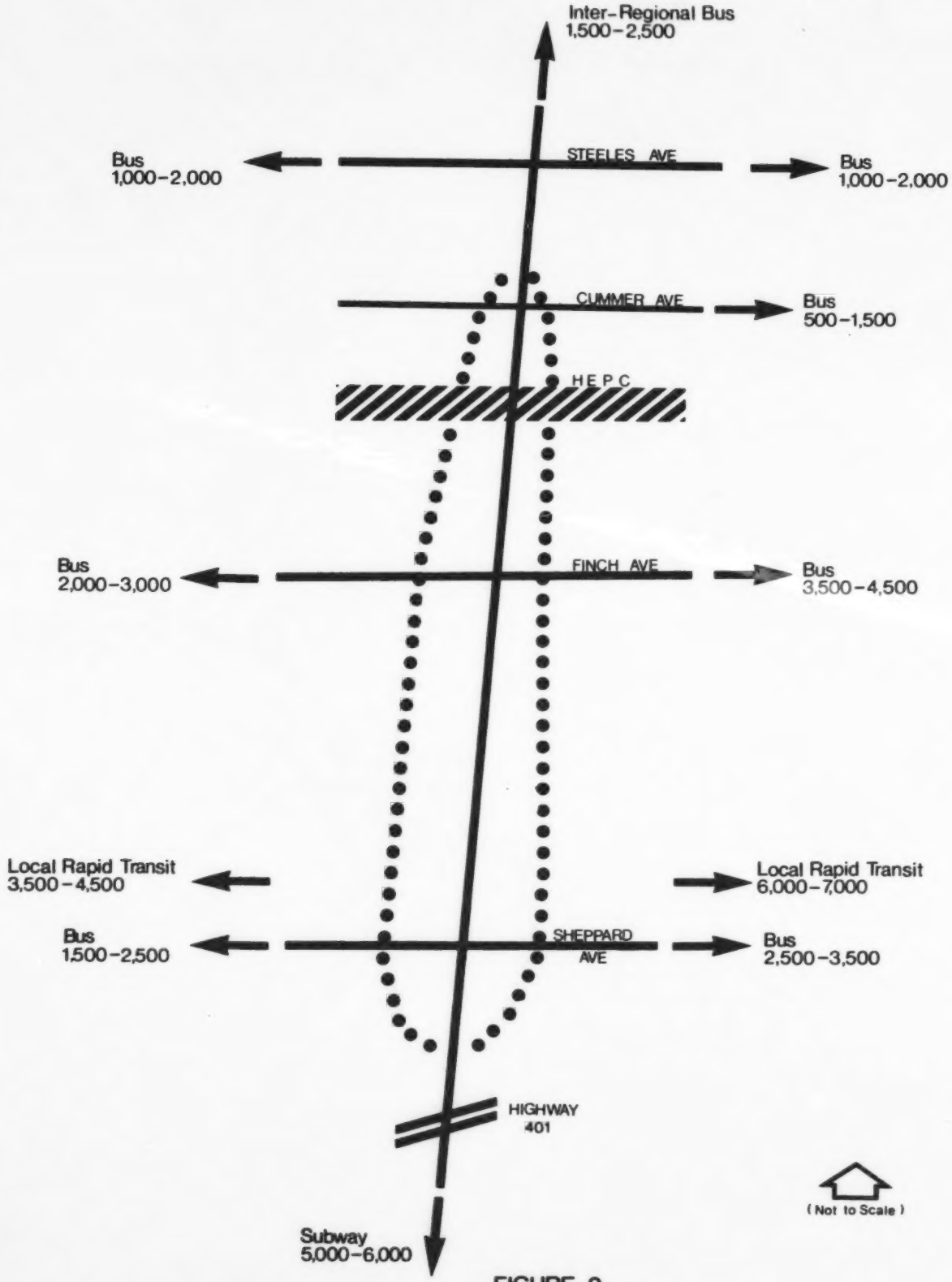
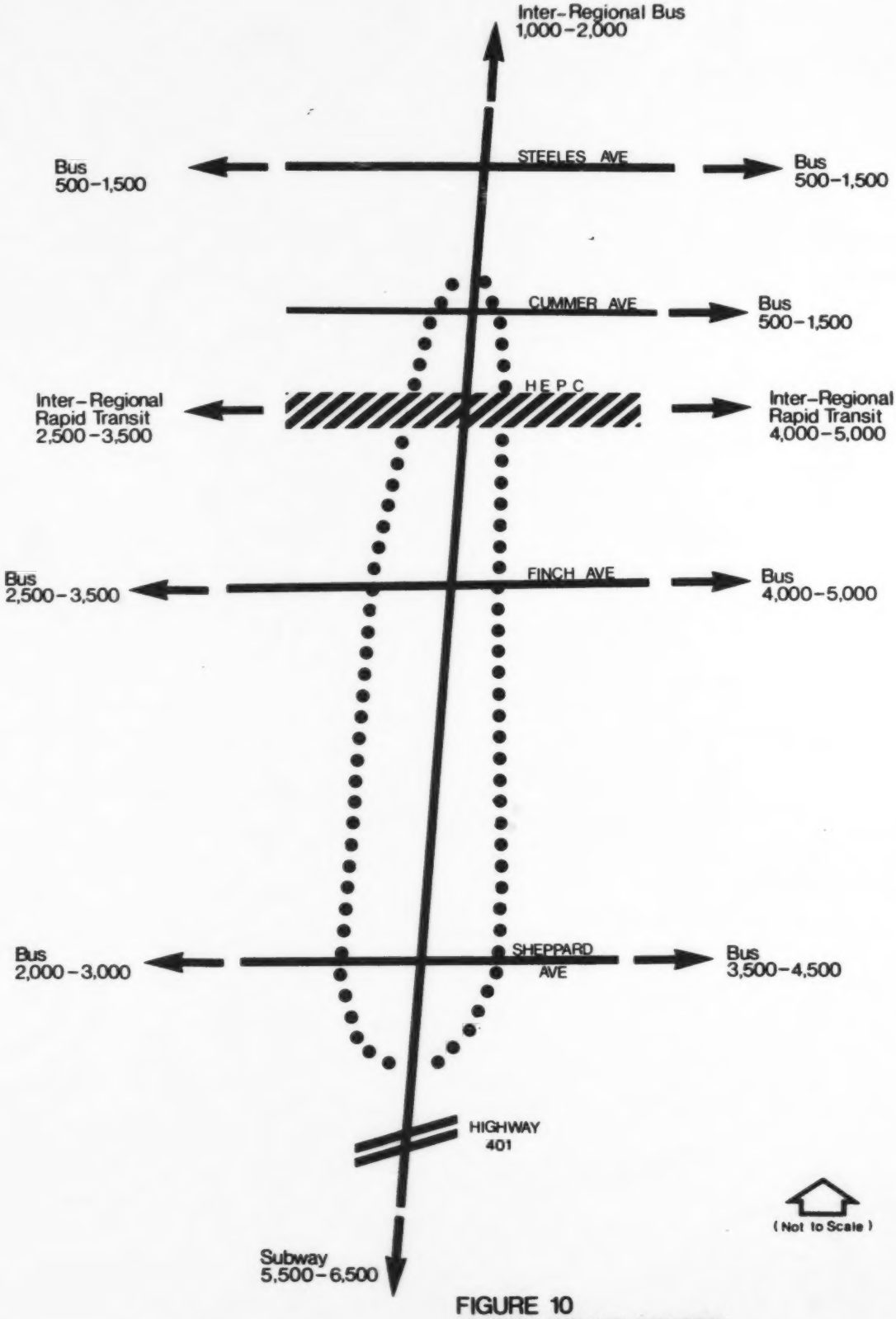


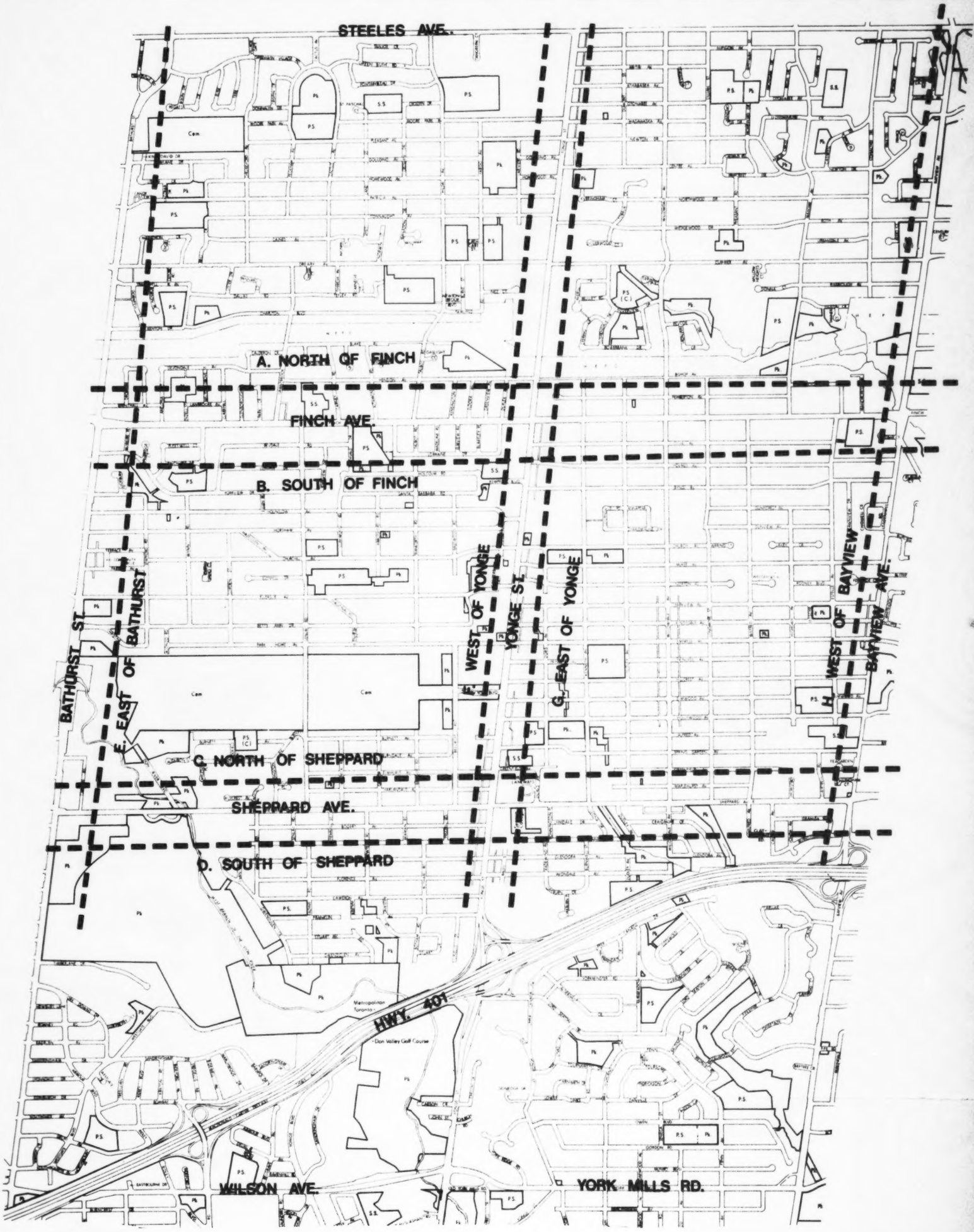
FIGURE 9
NORTH YONGE CENTRE
TRANSIT SYSTEM DEMAND
SCENARIO 3:
SHEPPARD LOCAL RAPID TRANSIT

LEGEND
3,500-4,500 : Outbound p.m. peak hour transit passengers



LEGEND
3,500-4,500 : Outbound p.m. peak hour transit passengers

FIGURE 10
NORTH YONGE CENTRE
TRANSIT SYSTEM DEMAND
SCENARIO 4 :
FINCH/HEPC INTER-REGIONAL
RAPID TRANSIT



(Not to Scale)

FIGURE 11
SCREENLINE LOCATIONS

APPENDIX

Background and Working Papers

1. North Yonge Centre - Work Program
2. North Yonge Centre - Improvement Options
3. Proposal for Yonge Street Origin - Destination Survey
4. Yonge Street Origin - Destination Survey
5. Working Paper #1: Study Purpose, Objectives and Scope
6. Working Paper #2: Existing Transportation System
7. Working Paper #3: Land Use Data
8. Working Paper #4: Trip Generation
9. Working Paper #5: Trip Distribution/Assignment
10. Working Paper #6: Modal Split/Vehicle Occupancy
11. Working Paper #7: Travel Demand Analysis
12. Working Paper #8: Phase II Work Program
13. Discussion Paper #1: Long Range Transportation System Requirements
14. Discussion Paper #1: Summary